

Appi. No. 10/643,717

Reply dated January 17, 2006

Reply to Office Action of November 14, 2005

Atty. Ref. 81912.0014

Customer No. 26021

Remarks/Arguments

Reconsideration of this application is requested. Since January 14, 2006 was a Saturday, and Monday, January 16, 2006 was a federal holiday, this reply is being filed within two months of the mailing date of the final Action.

Claim Status

Claims 1-38 were previously presented. Claims 3, 8-11, 13, 14, 16, 17, 20, 24-27, 29, 30, 32 and 33 are withdrawn from consideration as a result of a previous restriction of species requirement and election. Since this response does not add, amend or cancel any claims, no listing of claims is required under 37 CFR 1.121.

Claim Rejections – 35 USC 103

Claims 1, 2, 4-7, 12, 15, 18, 19, 21-23, 28 and 31 are rejected under 35 USC 103(a) as obvious over Hori (US 6,469,398) in view of Aono (US 5,521,429). Applicant once again traverses these rejections and submits that the claims include limitations that are neither taught nor suggested by Hori and Aono.

Independent claims 1 and 18 recite two important structural features that are not disclosed or suggested by either Hori or Aono:

1) first and second heat sink portions (claim 1) or connecting portions (claim 18) of first and second lead frames are provided on first and second surfaces of a semiconductor chip; and

2) part of the surfaces of the first and second heat sink portions (or connection portions) are not covered by the housing sealing the semiconductor chip.

These features permit heat dissipation to be carried out very effectively and is especially suitable for power semiconductor devices.

With respect to Hori, applicant strongly disagrees with the Examiner's position that, since first lead 11 of Hori is capable of absorbing heat, it functions as a heat sink portion. Lead 11 is merely a lead frame that is connected to electrode 15 through bump contact 7a. Consequently, lead 11 functions as a *non-heat sink*

portion and not a heat sink portion as is required by applicant's claims. Lead 11 cannot be considered in a vacuum – it must be considered in the context of Hori's disclosure and, in that context, one of ordinary skill in the art would clearly not recognize lead 11 as a heat sink as claimed by applicant. Moreover, bump contact 7a is not a heat sink portion as required by applicant's claims.

Thus, Hori discloses only a single heat sink portion – heat spreader 6 – and not two heat sink portions as required by independent claims 1 and 18. Likewise, Aono discloses only a single heat sink portion. Thus, the requirement of two heat sink portions is completely lacking from both Hori and Aono.

Hori and Aono also fail to meet the requirement that portions of the two sink portions be exposed from the sealing housing. Hori teaches that an outer surface of single heat sink portion 6 is exposed from sealing body 5. Aono shows an outer bottom surface of single heat sink portion 40 exposed from resin package 44. Neither shows an exposed portion of a second heat sink portion.

Applicant further notes that since Hori's first lead 11 is covered with sealing body 5, *even if* an electrode connecting portion of first lead 11 of Hori were to correspond to the connecting portion recited in claim 18, as the Examiner asserts, no connecting portion of first lead 11 is exposed from sealing body 5.

Conclusion

For these reasons, this application is believed to be in condition for allowance. The rejections under 35 USC 103(a) should be withdrawn. The Examiner is invited to telephone the undersigned to resolve any issues that remain after consideration of this reply.

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Any fees due with this response may be charged to our Deposit Account No.
50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: January 17, 2006

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